



U.S. Department of Energy's Office of Science

Fusion SciDAC Projects

SciDAC PI Meeting



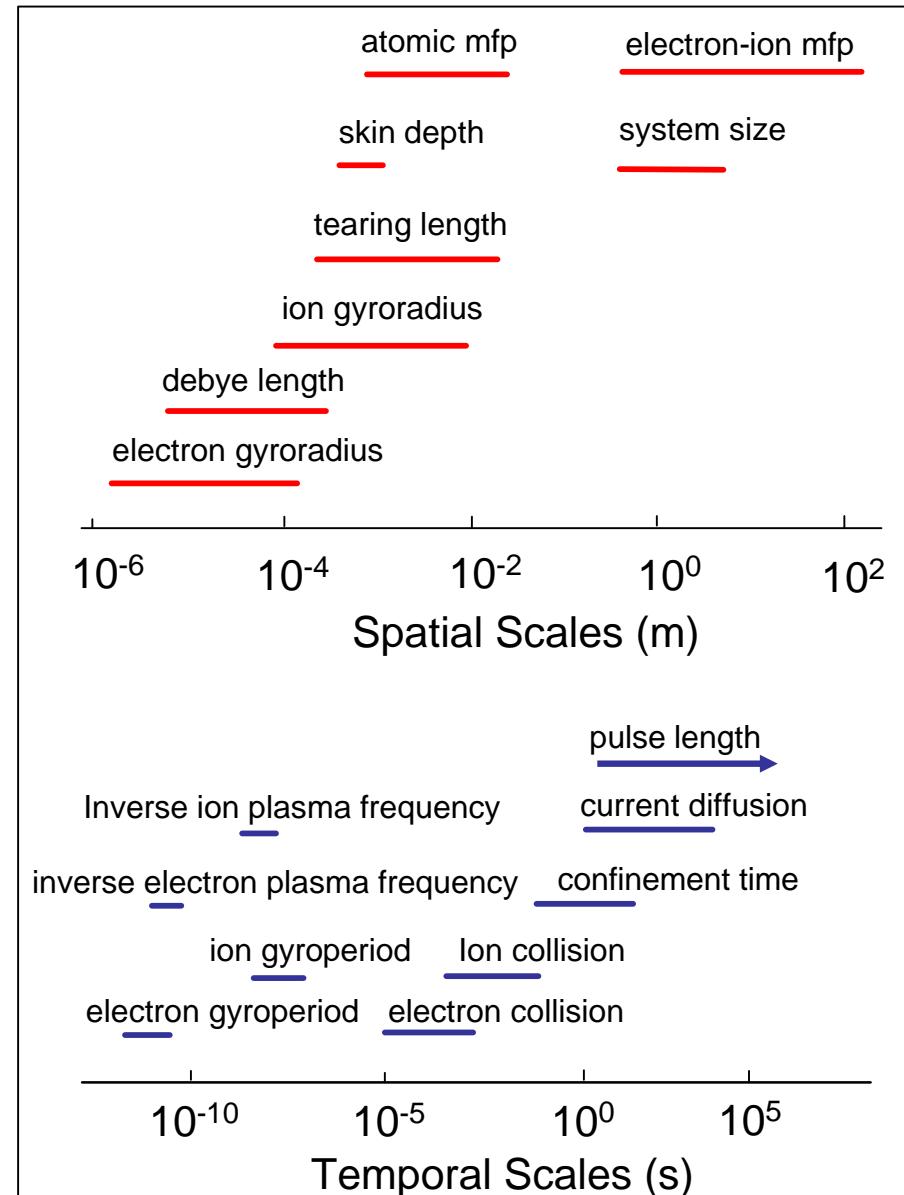
www.ofes.fusion.doe.gov

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Challenges in Plasma Theory and Simulation

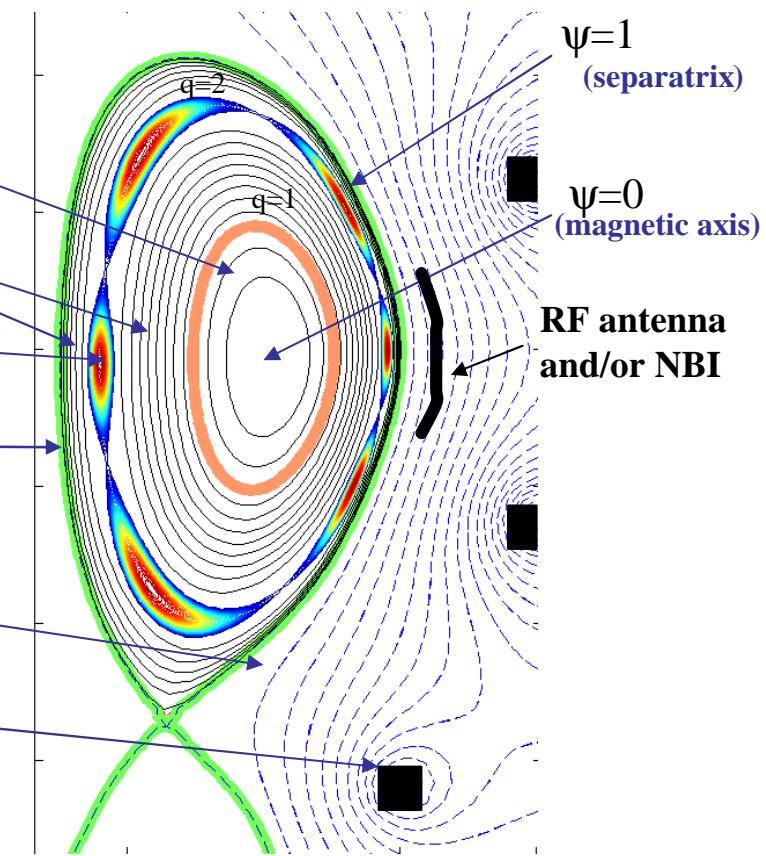
- Large range of spatial and temporal scales
- Overlap in scales often means strong (simplified) ordering not possible





Research Themes in Fusion Theory

- Sawtooth Region ($q < 1$)
 - MHD and Global Stability
- Core Confinement Region
 - Turbulent Transport, Radio-Frequency Wave Propagation
- Magnetic Islands ($q = 2$)
 - MHD and Global Stability
- Edge Pedestal Region
 - Edge Physics, MHD, Turbulence
- Scrape-off Layer
 - Atomic Physics, Parallel Flows, Turbulence
- Vacuum/Wall/Conductors/Antenna
 - MHD Equilibrium, Radio-Frequency (RF)Wave Heating, Neutral Beam Injection (NBI) Heating, Plasma-Material Interaction



Contours of Constant Poloidal Flux

Magnetic field lines lie within constant ψ surfaces